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NASA SimLabs News

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Welcome New Subscribers!

If you are receiving this newsletter for the first time, SimLabs News is a quarterly publication reviewing current projects at the NASA Ames Simulation Laboratories (SimLabs). [NASA SimLabs](#) is comprised of three unique Flight Simulators, an Air Traffic Control radar simulator and a high fidelity Air Traffic Control Tower simulator. The facilities support government as well as private industry in a wide array of applications. To find out more, read on!

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1. How Will New Large Aircraft Affect Hub Operations?

The advent of new large aircraft (*NLA*), classified generally as larger than the Boeing 747-400, has major airports addressing the infrastructure changes they will need to accommodate them. The Airbus A380 will be the first of the new fleet of *NLA*.

The A380 is scheduled to enter into service in 2006. The A380's wingtip span of 262 feet is

about 50 feet wider than that of the 747, and its maximum take-off weight will be about 40% greater. The largest international airports, including several in the U.S. (Los Angeles, San Francisco, New York's Kennedy, Washington's Dulles and Miami) are facing major modifications to accommodate the A380: pavement enhancements, taxiway, runway and fillet widening, double-decker jet bridges, and other construction to handle at least 550 passengers or 150 tons of cargo.



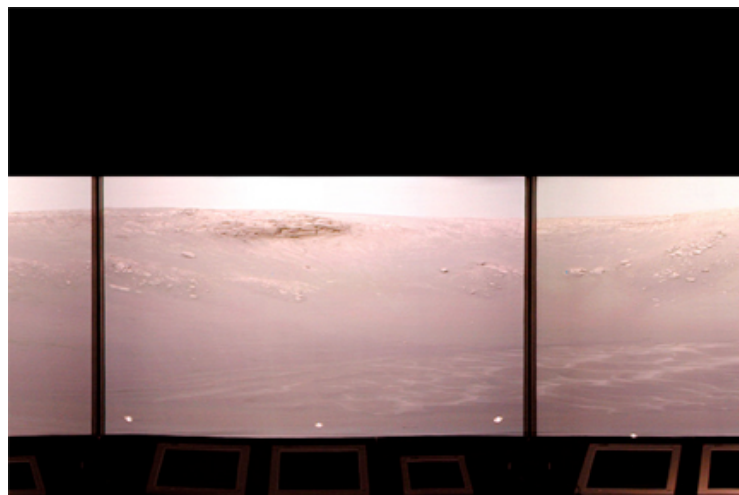
Airbus A380 as Modeled in FutureFlight Central

In addition, operational questions remain regarding the impact of the A380 on airport capacity and delays. Will controllers have to temporarily clear adjacent runway and taxiway surfaces so these behemoths can land and taxi safely to their gates? How much disruption will such an event cause, especially during peak traffic times? How can operations be managed to minimize the impact of an *NLA* arrival or departure?

NASA FutureFlight Central is an ideal venue to address these concerns. The A380 model is the most recent addition to our fleet of over 130 aircraft type/livery combinations. In FutureFlight's virtual control tower, air traffic controllers can operate their airport of the future and include *NLA* such as the A380, to develop, test, and evaluate surface management strategies in the safety of the simulation environment.

For more ideas on how real-time simulation can bring the future alive now, see our website on [airport planning](#).

2. Seeing through the Eyes of Spirit and Opportunity



Portion of Endurance Crater as Viewed in FutureFlight Central

SimLabs' 360-degree presentation of the images returned by the Mars Exploration Rovers lets you view the planet as though you were standing right there on the surface. As the twin rovers, Spirit and Opportunity, move across the Martian landscape, they are frequently halted to visually reassess their surroundings. SimLabs' air traffic control tower, FutureFlight Central, provides a unique opportunity to experience the spectacular terrain in the surround. View a QuickTime Panorama of [Mars' Bonneville Crater](#). (Download the latest version of QuickTime [here](#))

The immersive experience, especially of three-dimensional or stereo images, provides an unequalled sense of depth, size, and surface features such as subtle contours, craters or hills. Powerful image generation and a unique display system allow smooth virtual movement through the photorealistic Mars terrain. Such visualizations should better serve scientists in future remote planetary endeavors. NASA recognizes that the improved sense of spatial relationships will facilitate geological assessments as well as make rover path planning much easier.

Streamlining the process of building 3-D databases will be an important enhancement. Today, NASA-developed software generates 3-D databases by comparing stereo images, but producing a 3-D digital model of the landscape in near-real-time remains a challenge. To support mission operations, NASA is working on ways to more quickly and easily merge image data from multiple sources, simplify geometry, and correct for color distortions. In the future, we aim to provide scientists with the ability to move (virtually) in remote 3-D landscapes within hours or even minutes.

3. Shuttle Astronauts Get a "Touch of Glass"

Every Space Shuttle pilot comes to the [Vertical Motion Simulator \(VMS\)](#) at NASA Ames Research Center to practice landing the Orbiter. The VMS provides the most realistic motion and the largest motion envelope available to practice this crucial maneuver under various landing conditions. Perfect shuttle landings are vital because the Orbiter is a glider and cannot "go-around" for second approach if the first one is missed.

In May 2000, astronauts aboard Space Shuttle Atlantis, equipped with the first glass cockpit, delivered supplies to the International Space Station. The glass cockpit, also known as the Multifunction Electronic Display Subsystem (*MEDS*), consists of nine flat panel Liquid Crystal Displays (*LCDs*) that replaced the three *CRT* displays and the electro-mechanical steam gauges.

The *MEDS* improves the pilot's situational awareness during the mission by providing color cues and warnings in the familiar stoplight colors indicating the priority of each specific problem. *MEDS* also allows the Shuttle pilots to select various multi-color display formats at the push of a button. This provides greater operational flexibility while reducing crew workload. Since the Atlantis flight in May 2000, the entire Space Shuttle fleet has been upgraded to *MEDS*.

Because the Vertical Motion Simulator (*VMS*) is an integral part of the Space Shuttle crew training, SimLabs engineers are now upgrading the Shuttle Simulator Cab (*S-CAB*) and software to *MEDS* to



Shuttle Cockpit before MEDS Upgrade (above)
Shuttle Cockpit after MEDS Upgrade (below)



match the real cockpit.

There are two components to the upgrade. First, the *S-CAB* will be reconfigured with five new flat panel *LCD* displays, which the pilot uses for the landing portion of the flights. Second, the math model and graphics software will be upgraded to match the version currently used in the Shuttle program.

The *VMS MEDS* upgrade will be completed in time for the next Space Shuttle Training scheduled for September 2004.

4. Visit SimLabs New Website

Click [SimLabs'](#) website to see how integration of NASA's sophisticated simulation facilities supports our Nation's present and future aerospace needs.

5. Upcoming Events and Conferences

Look for us at these future industry events:

[49th Annual Air Traffic Control Association \(ATCA\) Conference and Exposition](#)

October 31 – November 3, 2004

Washington, D.C.

[Interservice/Industry Training, Simulation and Education Conference \(IIITSEC\)](#)

Look for SimLabs in the OneNASA Booth

December 6-9, 2004

Orlando, Florida

6. Thinking of Doing Business with NASA SimLabs?

For more information on what we can do for your needs, contact:

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